

WHAT IS CLAIMED IS:

1. A method for embedding a digital watermark, comprising:
 - a step of inputting digital watermark information;
 - a step of inputting an image;
 - a step of dividing the image into a plurality of areas;
 - a step of ordering the plurality of areas according to a predetermined ordering criterion;
 - a step of embedding the digital watermark information over the plurality of areas that have been ordered; and
 - a step of outputting an image with the digital watermark information embedded therein.
2. A method according to Claim 1, further comprising a circumscribed-rectangle detecting step of detecting rectangles circumscribed respectively to characters included in the image, wherein the digital watermark information is embedded in the embedding step based on the circumscribed rectangles detected.
3. A method according to Claim 1, wherein the image input in the input step is a document image at least including a plurality of document areas.

4. A method according to Claim 3, wherein the plurality of document areas included in the document image is ordered in the ordering step.

5. A method according to Claim 4, wherein the plurality of document areas is ordered in the ordering step based on sizes of the respective document areas.

6. A method according to Claim 5, wherein a plurality of document areas with the same size is ordered in the ordering step based on a relationship of relative positions thereof.

7. A method according to Claim 5, further comprising a step of exempting a part of the plurality of document areas from ordering prior to the ordering step.

8. A method according to Claim 4, wherein the plurality of document areas is ordered in the ordering step based the numbers of characters included in the respective document areas.

9. A method according to Claim 8, wherein a plurality of document images with the same number of characters included is ordered in the ordering step based on a

relationship of relative positions thereof.

10. A method according to Claim 8, further comprising a step of exempting a part of the plurality of document areas from ordering prior to the ordering step.

11. A method according to Claim 4, further comprising a second embedding step of embedding information representing an order of the document areas that have been ordered.

12. A method according to Claim 4, wherein digital watermark information having one bit is embedded in the embedding step by rotating a character included in each of the document areas.

13. A method according to Claim 4, wherein digital watermark information having a predetermined number of bits larger than one bit is embedded in the embedding step by rotating a character included in the each of the document areas.

14. A method according to Claim 4, wherein digital watermark information is embedded in the embedding step by adjusting a gap between characters included in each of the

document areas.

15. A method according to Claim 4, wherein digital watermark information is embedded in the embedding step by units of a predetermined number of characters included in each of the document areas.

16. An apparatus for embedding a digital watermark, comprising:

- an input unit for inputting digital watermark information;

- an image input unit for inputting an image;

- an area dividing unit for dividing the image into a plurality of areas;

- an area ordering unit for ordering the plurality of areas according to a predetermined ordering criterion;

- an embedding unit for embedding the digital watermark information over the plurality of areas that have been ordered; and

- an output unit for outputting the image with the digital watermark information embedded therein.

17. A computer program product storing a program for embedding a digital watermark, the program comprising:

- a step of inputting digital watermark information;

- a step of inputting an image;
- a step of dividing the image into a plurality of areas;
- a step of ordering the plurality of areas according to a predetermined ordering criterion;
- a step of embedding the digital watermark information over the plurality of areas that have been ordered; and
- a step of outputting an image with the digital watermark information embedded therein.

18. A method for detecting a digital watermark, comprising:

- a step of inputting an image with digital watermark information embedded therein;
- a step of dividing the image into a plurality of areas;
- a step of ordering the plurality of areas according to a predetermined ordering criterion;
- a step of detecting the digital watermark information from over the plurality of areas that have been ordered; and
- a step of outputting the digital watermark information detected.

19. An apparatus for detecting a digital watermark, comprising:

- an input unit for inputting an image with digital watermark information embedded therein;

a dividing unit for dividing the image into a plurality of areas;

an area ordering unit for ordering the plurality of areas according to a predetermined ordering criterion;

a detecting unit for detecting the digital watermark information from over the plurality of areas that have been ordered; and

an output unit for outputting the digital watermark information detected.

20. A computer program product storing a program for detecting a digital watermark, the program comprising:

a step of inputting an image with digital watermark information embedded therein;

a step of dividing the image into a plurality of areas;

a step of ordering the plurality of areas according to a predetermined ordering criterion;

a step of detecting the digital watermark information from over the plurality of areas that have been ordered; and

a step of outputting the digital watermark information detected.